CLAIMS

1. A method, suitable for stand off analysis of a sample, comprising:
   (i) using an excitation means to vaporise the sample thereby producing a vapour plume of molecular species; and
   (ii) using an analytical means to analyse the molecular species within the vapour plume wherein the analytical means analyses the molecular emission spectra of the vapour plume.
2. A method according to Claim 1 wherein the excitation means is a laser.
3. A method according to Claim 2 wherein the laser is operated at a fixed wavelength.
4. A method according to any of Claims 2 to 3 wherein the laser has a power of greater than about 2 W, preferably greater than about 5 W, and more preferably greater than about 10 W.
5. A method according to any of Claims 2 to 4 wherein the laser has a power of less than about 150 W, preferably less than about 50 W, more preferably less than about 20 W.
6. A method according to any of Claims 2 to 5 wherein the laser is operated as continuous laser beam.
7. A method according to any of Claims 2 to 6 wherein the laser is a carbon dioxide laser.
8. A method according to any of Claims 1 to 7 wherein the method does not comprise a secondary excitation of the vapour plume.
9. A method according to Claim 8 wherein the method comprises only the use of a single excitation means.

10. A method according to any of Claims 1 to 9 wherein the vapour plume is hotter than the surrounding atmosphere by at least about 0.1K, preferably by about 1K, and more preferably by about 5K.

11. A method according to any of Claims 1 to 10 wherein the analytical means is fitted with a means for stand-off detection of the analytical signals from the vapour plume.

12. A method according to any of Claims 1 to 11 wherein the analytical means is an infrared spectrometer, preferably a Fourier transform infrared spectrometer.

13. A kit suitable for stand off analysis of a sample, comprising:

(i) an excitation means; and

(ii) an analytical means,

whereby the excitation means is arranged such that it can be used to vaporise the sample thereby producing a vapour plume of molecular species and whereby the analytical means is arranged to analyse the emission spectra of the molecular species within the vapour plume.

14. An apparatus suitable for stand off analysis of a sample, comprising:

(i) an excitation means; and

(ii) an analytical means;

whereby the excitation means is arranged such that it can be used to vaporise the sample thereby producing a vapour plume of molecular species and whereby the analytical means is arranged to analyse the emission spectra of the molecular species within the vapour plume.